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Inflammability of Chaparral Depends on How It Grows

By Charles C. Buck
Chief, Division of Forest Fire Research

Southern California chaparral has long been noted for its inflammability. Most of the blame for this bad reputation is usually assessed to general character of the vegetation, steep slopes, and severe weather conditions. Probably not enough emphasis has been given to changes in the vegetation itself that affect its fuel qualities.

All evergreen California chaparral species normally grow new twigs and leaves in the spring and drop a portion of the older leaves in the summer and fall. When vegetation of this type is first established, the volume of green branchwood and number of leaves increase annually until the vegetation completely occupies the site. Then the quantity of stems and the density of the canopy depend on the soil and on the amount of moisture available in it. For the canopy to reach full development usually requires 8 to 12 years, during which time little dead wood or litter is produced and fire presents no particular problem.

When the site becomes fully occupied the annual production of new twigs and leaves continues, but is balanced by the death of older branches and leaves. In normal years there is a seasonal cycle in inflammability caused by an increase in numbers of leaves with high moisture contents in the spring, then a decrease in numbers and a decline in leaf moisture in summer and fall. Normally, this annual cycle of balanced growth and death causes a gradual build-up of dead fuels. But inflammability is usually kept within reasonable, though seasonally variable limits by the slow compacting and decay of accumulated litter, and by the overstory of green leaves which shields against sun, wind, and desiccation.

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This normal state of affairs has been upset since 1945--the beginning of the present southern California drought. By 1948 the shortage of rainfall began showing its effects on the chaparral cover. The first apparent sign was the appearance of individual dead bushes scattered over the landscape. Soil moisture had by then become insufficient to support the existing volume of cover.

By the time the 1950 fire season got under way it could be seen that catastrophe might well be in the offing. The top soil was powder dry. In some areas there was little if any growth of new leaves. More than average numbers of old leaves, too, had fallen. Instead of full-bodied dense crowns, thin, transparent, drab-colored foliage met the eye. By mid-summer the chaparral looked and felt parched. That it could be so dry and still be alive was unbelievable. The canopy over large areas was punctured with stark, dead branches, and many more than the usual number of dead shrubs could be seen.

This marked change in growth--or lack of it--meant a much higher than normal ratio of dead to green fuel, extremely inflammable foliage, higher fuel temperatures from increased exposure to the sun, more freedom of air movement--meaning more wind close to the ground.

Years of drought are often characterized by low humidities and high temperatures. These occurred often in the summer of 1950. The lack of moisture in soil and vegetation also held the pickup of humidity and fuel moisture at night to a minimum, resulting in extra long daily burning periods.

The combination of deteriorated cover and severe weather had by 1950 reached the point of near-maximum conflagration potential. Only more deaths of individual shrubs could make it worse. So far this year the southern part of the state has received only half or less of its normal seasonal rainfall. The odds in early May are that there will be little more. The outlook for the 1951 southern California fire season is thus for more thinning and dying out of shrubs with a consequent increase in inflammability beyond anything yet experienced in our time.